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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|------------------|
| 10/627,461 | 07/25/2003 | Wemer M.A. Grootaert | 57989US004 | 3246 |
| 32692 | 7590 | 11/26/2004 | | |
| 3M INNOVATIVE PROPERTIES COMPANY PO BOX 33427 ST. PAUL, MN 55133-3427 | | | EXAMINER | HU, HENRY S |
| | | | ART UNIT | PAPER NUMBER |
| | | | 1713 | |

DATE MAILED: 11/26/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | |
|------------------------------|-------------------------|------------------|
| Office Action Summary | Application No. | Applicant(s) |
| | 10/627,461 | GROOTAERT ET AL. |
| | Examiner Henry S. Hu | Art Unit 1713 |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 14 October 2004.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1-10 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) Interview Summary (PTO-413)
Paper No(s)/Mail Date _____.
- 5) Notice of Informal Patent Application (PTO-152)
- 6) Other: _____.

DETAILED ACTION

1. This Office Action is in response to the Amendment filed on October 14, 2004.

Claims 1, 5 and 7 were amended, and no new claim was added. To be more specific, parent **Claim 1** and dependent 5 were amended to clarify the grouping, while Claim 7 was rewritten with a method to remove the 101 and 102-2nd rejections as suggested by the examiner.

With respect to the specification objections (a) and (b), the Applicants have corrected all informalities as suggested by the examiner; particularly to correct the improper chemical structure on page 11. In view of above amendment, the examiner thereby withdraws the specification objections, claim objections and 101/112-2nd rejection of office action dated 7-14-2004 are now removed. In view of Applicant's argument (see pages 6-8 of Remarks) on the use of **Grootaert et al. (US 6,720,360 B1)** as prior art, the examiner also withdraws the 103 rejections for Claims 1-10 of office action dated 7-14-2004. **Claims 1-10 are now pending.** An action follows.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

- (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
 2. Ascertaining the differences between the prior art and the claims at issue.
 3. Resolving the level of ordinary skill in the pertinent art.
 4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
3. Claims 1-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schmiegel (US 5,973,091) in view of Beyer et al. (US 5,463,021) and Legare et al. (WO 95/02634).

The limitation of parent Claim 1 of the present invention relates to a curable fluoroelastomer composition comprising: (A) a perfluoropolymer having one or more cure-sites selected from a halogen capable of participating in peroxide cure reaction and/or nitrile groups; (B) an organic peroxide and/or a compound capable of effecting curing of the perfluoropolymer through said nitrile groups; and (C) optionally a polyunsaturated coagent; wherein the perfluoropolymer is essentially free of ionic end groups and wherein the total amount of metal cations in the composition is not more than 10 µg/g perfluoropolymer.

Other parent Claim 10 relates to the process of making fluoropolymers of Claim 1 but with end group free or with –CF₂Cl end groups. See other limitations of dependent Claims 2-9.

4. Regarding the limitation of parent **Claim 1**, Schmiegel discloses the preparation of curable perfluoroelastomer compositions having an improved processability due to reduced levels of ionized or ionizable polymer endgroups (abstract, line 1-3). Schmiegel further discloses the ionized or ionizable groups can be reduced by decarboxylation of perfluoroelastomers having carboxyl or carboxylate in the end or pendant groups (column 3, line 67 – column 4, line 4). Such fluoroelastomer compositions may additionally contain cure-site monomers such as nitrile-containing monomers (column 4, line 61 – column 5, line 25) as well as some aromatic amines such as bis(aminophenols) and bis(aminothiophenols) with organic peroxides for curing through nitrile groups in the polymers (column 9, line 56 – column 10, line 67).

5. However, the Schmiegel reference is silent about using a fluoroelastomer composition having the **claimed content of metal cations, which is less than 10 µg/g polymer**. With respect to such a low limitation on metal purity, Beyer et al. teach that the aqueous dispersions obtained from polymerization of fluorinated thermoplastics can be purified. The purification involves steps such as **compressing, coagulation, and elution through ion-exchange resins** to replace metal cations with proton ions (column

1, line 47-53; abstract, line 1-4; also see examples). The advantage is a high value product with substantially no metal cations can be obtained which can be useful for directly feeding to a melt extruder.

With respect to the **claimed content of metal cations, the examiner has replaced the prior art of Grootaert et al. (US 6,720,360 B1)** in view of the argument on the earlier office action. **Legare et al. teach that fluoropolymers can be purified to obtain high purity with metal ion content less than 500 ppb** (abstract, line 1-2; page 6, line 30-31). The advantage is that such pure polymers are useful in the field of electronic devices and semiconductor industry (see pages 1, line 15-18; page 7, line 1-6; page 8, line 9-14).

6. In light of the fact that Schmiegel, Beyer and Legare, all used curable fluoroelastomer compositions through peroxide/curative curing. Therefore, one having ordinary skill in the art would find it obvious to modify Schmiegel's polymer composition by **using a high purity polymer with reduced content of metal cations less than 500 ppb as taught by both Beyer and Legare**. By doing so, copolymers can be directly fed into extruder and then cured in either peroxide or aromatic amines to get the final product as useful material for electronic devices and semiconductor industry. A better and high value product can be thereby obtained.

7. Regarding **Claims 4 and 5**, other than using the nitrile-containing monomer, both perfluoro-olefin and perfluorovinyl ether are used as the two principal monomers by Schmiegel (column 4, line 5-19). The co-polymerization is done with ammonium persulfate as initiator in a conventional aqueous emulsion polymerization (column 6, line 8-21; column 13, line 9-28).

Regarding **Claims 8 and 10**, a redox binary system including both a reducing agent such as a sulfinate and an oxidizer such as ammonium persulfate can be used as initiator (column 6, line 34-35) since the conventional free radical induced polymerization is used by the references to prepare the polymers.

Regarding **Claim 9**, Schmiegel discloses in the course of polymer purification, the polymer emulsion can be coagulated with an aqueous solution of magnesium sulfate (column 13, line 21-22).

Remaining dependent **Claims 2-3 and 6-7** are thereby rejected with above rejection for Claims 1, 4-5 and 8-10.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicants' disclosure. The following references relate to a curable fluoroelastomer

composition comprising a high-purity perfluoropolymer having one or more cure-sites from a halogen or nitrile:

US Patent No. 5,852,149 to Abusleme et al. discloses the preparation of a curable perfluoroelastomer composition comprising VDF and/or TFE and at least another fluorinated ethylenically unsaturated monomer. Some Br- or I-containing cure-site monomers are included for peroxide curing (column 4, line 53-67). They are excellent in thermal stability (abstract, line 1-6). However, Abusleme is silent about using a fluoroelastomer composition having the **claimed content of metal cations**, which is less than 10 µg/g polymer.

9. Any inquiry concerning this communication or earlier communication from the examiner should be directed to Henry S. Hu whose telephone number is (571) 272-1103. The examiner can be reached on Monday through Friday from 9:00 AM –5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu, can be reached on (571) 272-1114. The fax number for the organization where this application or proceeding is assigned is (703) 872-9306 for all regular communications.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <<http://pair-direct.uspto.gov>>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

H.S.H

Henry S. Hu

November 10, 2004

DW

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